

Appl. No. 10/667,134
Amtd. Dated February 12, 2007
Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
Customer No.: 26021

RECEIVED
CENTRAL FAX CENTER

FEB 12 2007

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-2. (Canceled)

3. (Previously presented) The laminate as set forth in Claim 5, wherein:

the acid dianhydride component includes the pyromellitic dianhydride in a range of from 5 mole% to 90 mole%.

4. (Previously presented) The laminate as set forth in Claim 5, wherein:

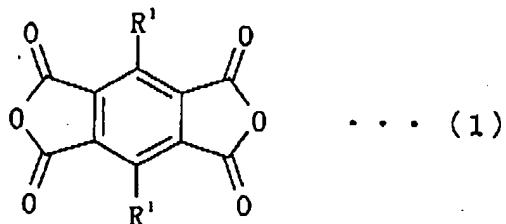
the diamine component includes the paraphenylene diamine in a range of from 25 mole% to 75 mole%, and diaminodiphenyl ether in a range of from 25 mole% to 75 mole%.

5. (Currently amended) A laminate comprising a metal layer and a polyimide film, the metal layer being directly formed on the polyimide film having a dynamic viscoelasticity whose tan δ peak is located in a range of not less than 310°C but not more than 410°C, and whose tan δ value at 300°C is not more than 0.05, the polyimide film prepared by copolymerizing an acid dianhydride component and a diamine component,

the acid dianhydride component including a pyromellitic dianhydride represented by Equation (1):

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



where R¹ is a residue selected from a group consisting of H-, CH₃-, CF₃-, Cl-, Br-, F-, and CH₃O-, and R¹ may be the same residues or different residues, and the diamine component including a paraphenylene diamine and a diaminodiphenyl ether,

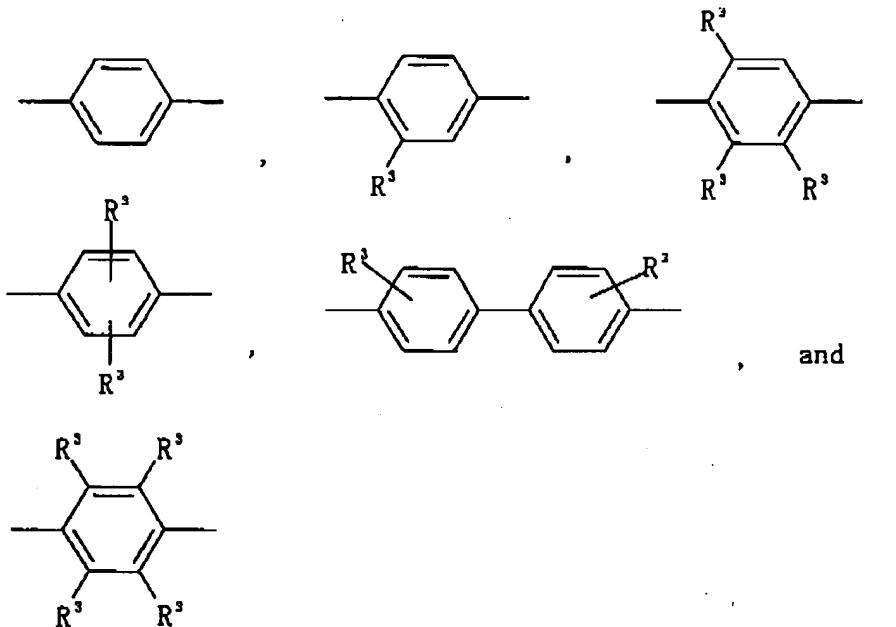
the paraphenylene diamine being represented by Equation (2):



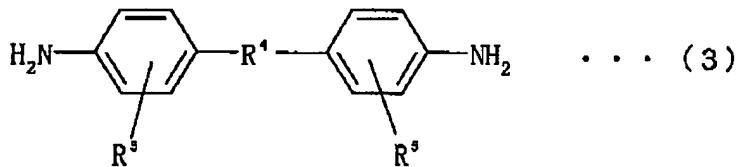
where R² is a bivalent aromatic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



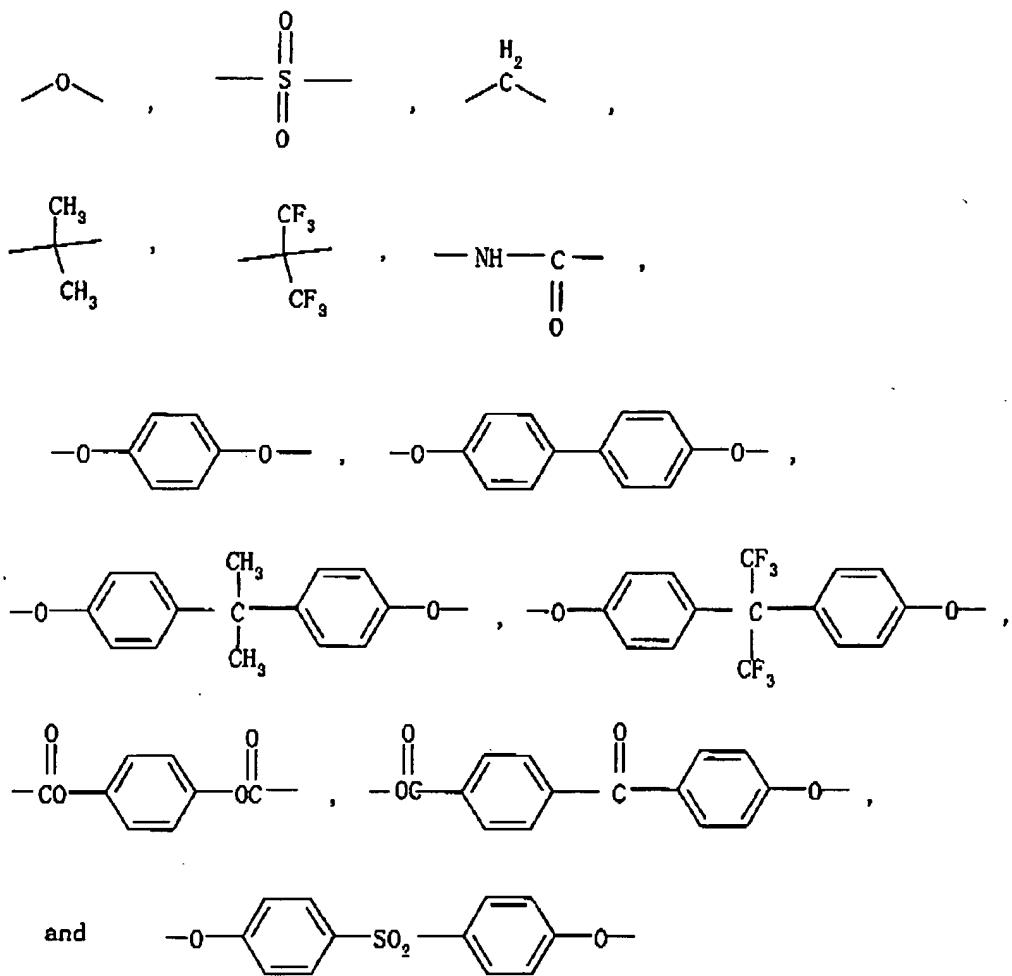
and each R³ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃, and the diaminodiphenyl ether being represented by General Formula (3):



where R⁴ is a bivalent organic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



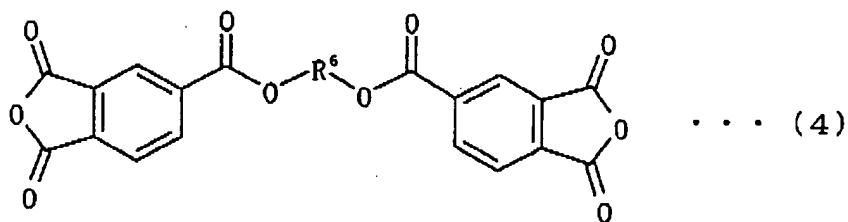
and each R⁵ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃,
 wherein:

the acid dianhydride component further includes a bis(trimellitic monoester anhydride) and/or a ~~biphenyl tetracarboxylic dianhydride~~,

Appl. No. 10/667,134
Amdt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
Customer No.: 26021

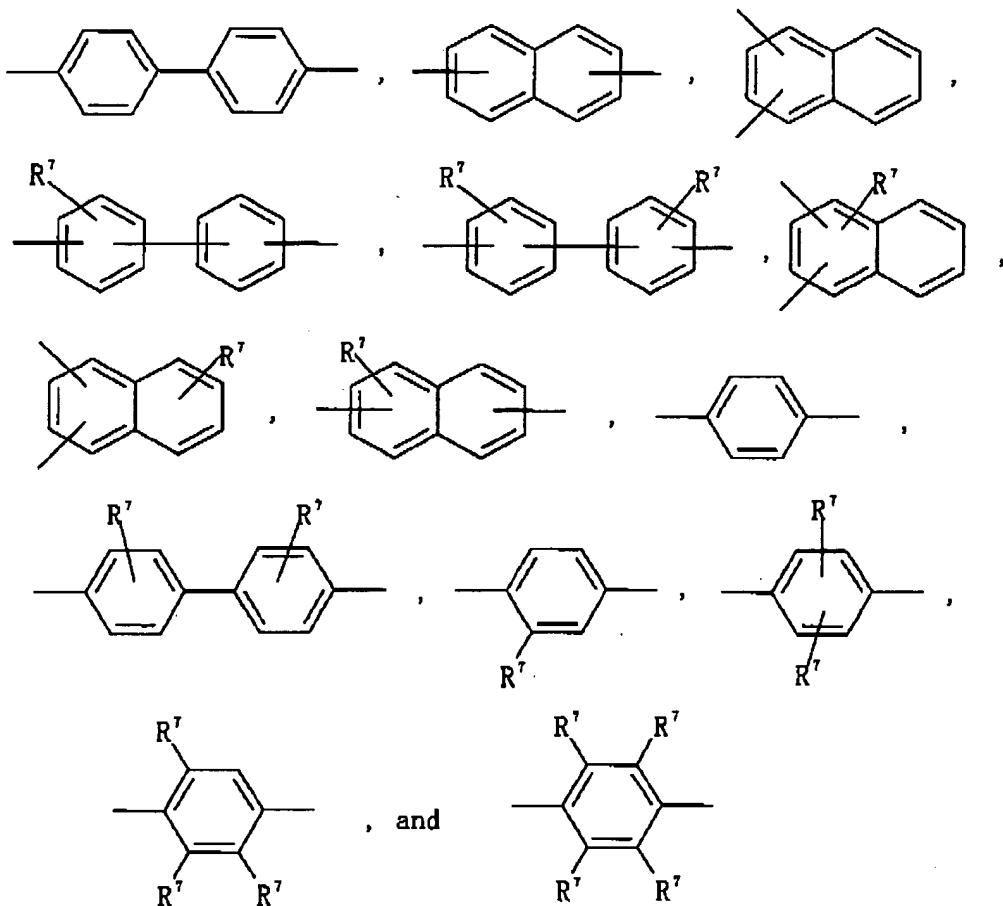
~~the bis(trimellitic monoester anhydride}~~ being represented by
General Formula (4):



where R⁶ is a bivalent organic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



and each R⁷ is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, and -CO-NH₂.

6. (Previously presented) The laminate as set forth in Claim 5, wherein

the acid dianhydride component includes the bis(trimellitic monoester anhydride) in a range of from 20 mole% to 40 mole%.

Appl. No. 10/667,134
Amdt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
Customer No.: 26021

7. (Currently amended) The laminate as set forth in Claim [[5]]
26, wherein

the acid dianhydride component includes the biphenyl tetracarboxylic dianhydride in a range of from 0 mole% to 50 mole%.

8. (Previously presented) The laminate as set forth in Claim 5, wherein:

the polyimide film has a coefficient of hygroscopic expansion is 16ppm/%RH or less, and a water absorption percentage is 2.0% or less.

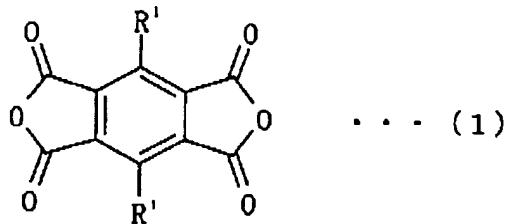
9-10. (Cancelled)

11. (Currently amended) A polyimide film prepared by copolymerizing an acid dianhydride component and a diamine component,

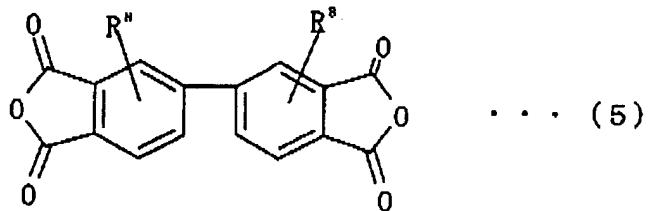
the acid dianhydride component including a pyromellitic dianhydride represented by General Formula (1), a bis(trimellitic monoester anhydride) represented by General Formula (4), and a biphenyl tetracarboxylic dianhydride represented by General Formula (5), the pyromellitic dianhydride being represented by General Formula (1);

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

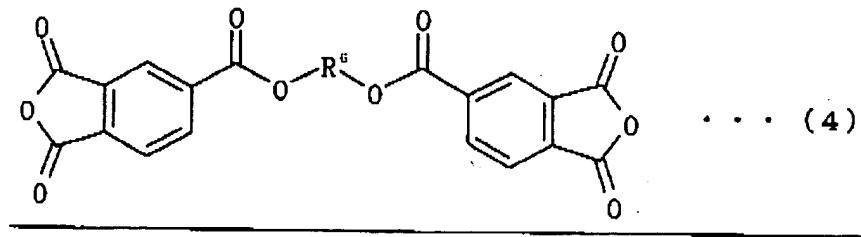
Attorney Docket No. 89227.0005
 Customer No.: 26021



where R¹ is a residue selected from a group consisting of H-, CH₃-, CF₃, Cl-, Br-, F-, and CH₃O-, and R¹ may be the same residues or different residues, and the biphenyl tetracarboxylic dianhydride being represented by General Formula (5):



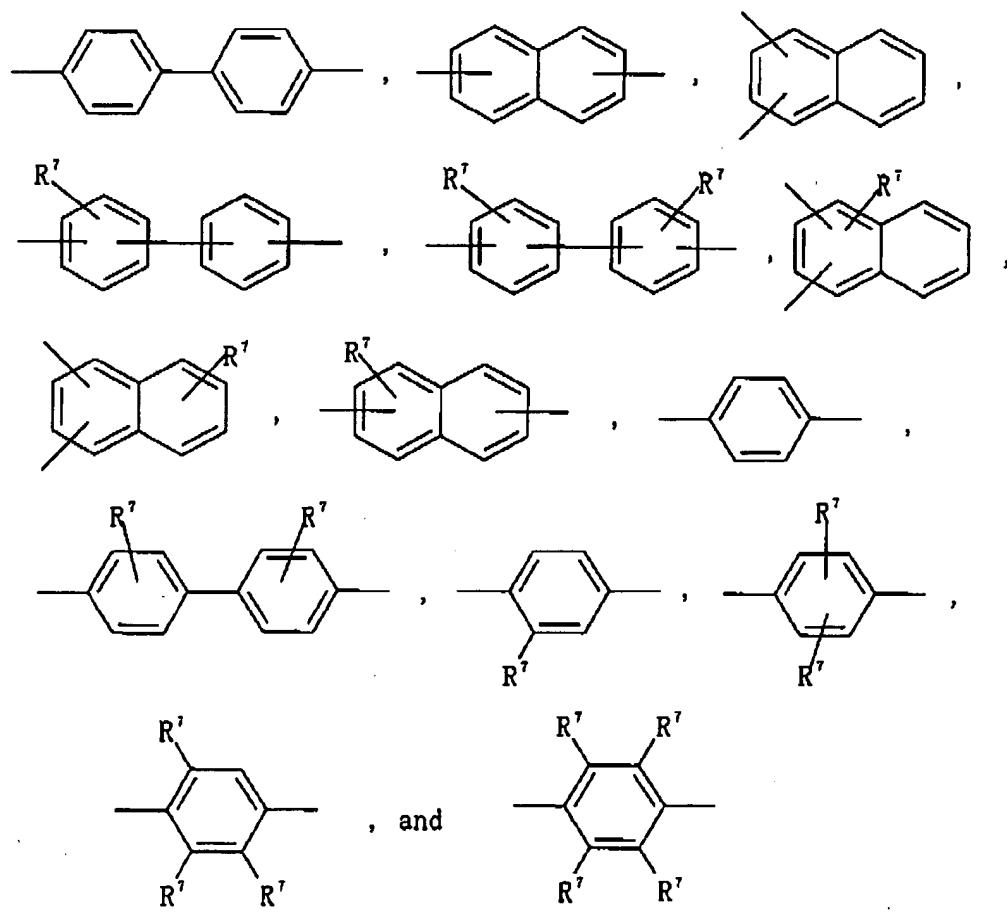
where R' is a residue selected from a group consisting of H-, CH₃-, Cl-, Br-, F- and CH₃O-, and R' may be the same residues or the different residues, and



Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

where R⁶ is a bivalent organic group selected from a group consisting of:



and each R⁷ is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, and -CO-NH₂.

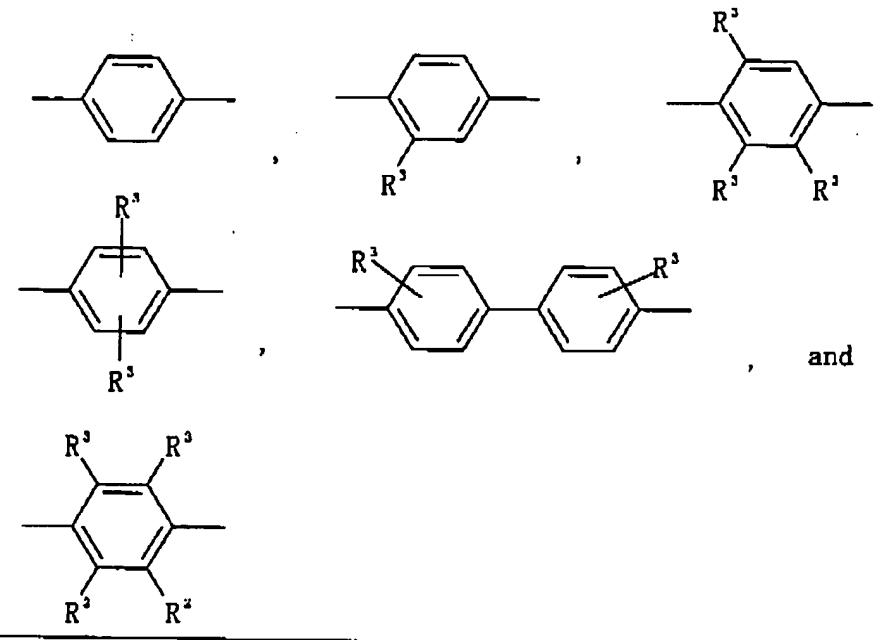
Appl. No. 10/667,134
Amdt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
Customer No.: 26021

the diamine component including a paraphenylene diamine represented by General Formula (2) and a diaminodiphenyl ether represented by General Formula (3), and



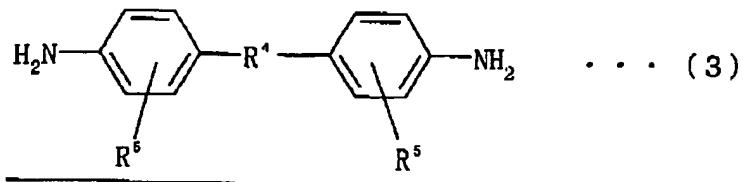
where R² is a bivalent aromatic group selected from a group consisting of:



and each R³ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃, and the diaminodiphenyl ether being represented by General Formula (3);

Appl. No. 10/667,134
Amdt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

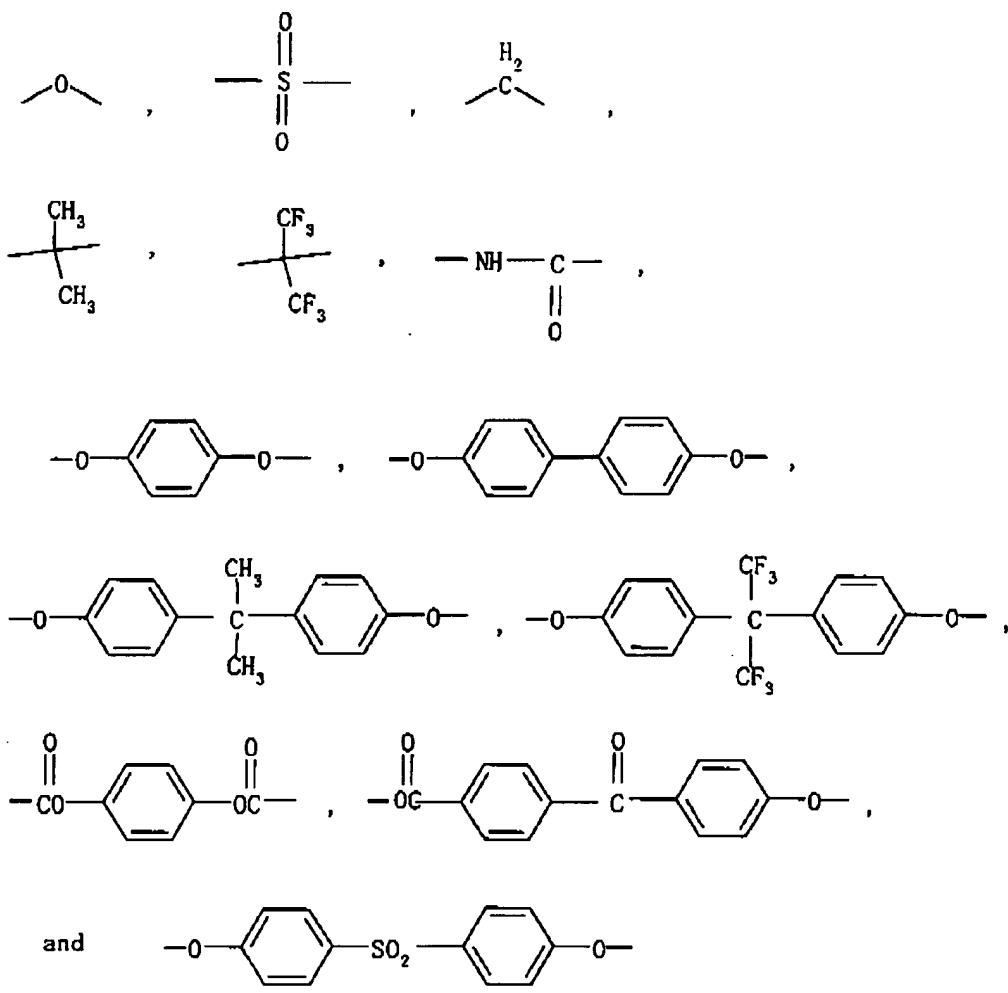
Attorney Docket No. 89227.0005
Customer No.: 26021



where R⁴ is a bivalent organic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



and each R⁵ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F and -OCH₃.

the polyimide film having such an etching speed that one side thereof is etched with a 1N potassium hydroxide solution at an etching speed of 0.1μm/minute (one side) or higher.

Appl. No. 10/667,134
Amdt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
Customer No.: 26021

12. (Canceled)

13. (Original) The polyimide film as set forth in Claim 11, wherein:

the acid dianhydride component includes the pyromellitic dianhydride in a range of from 30 mole% to 99.9 mole%, and the biphenyl tetracarboxylic dianhydride in a range of from 0.1 mole% to 50 mole%.

14. (Currently amended) The polyimide film as set forth in Claim [[12]] 11, wherein:

the diamine component includes the paraphenylene diamine in a range of from 15 mole% to 85 mole%, and diaminodiphenyl ether in a range of from 15 mole% to 85 mole%.

15. (Canceled)

16. (Currently amended) The polyimide film as set forth in Claim [[15]] 11, wherein:

The acid dianhydride component includes the bis(trimellitic monoester anhydride) in a range of from 10 mole% to 50 mole%.

17. (Original) The polyimide film as set forth in Claim 11, wherein:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

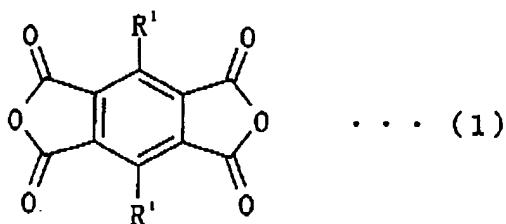
Attorney Docket No. 89227.0005
 Customer No.: 26021

a retention percent of tear-through resistance of the polyimide film after exposing the polyimide film to environment of a temperature of 150°C, a humidity of 100%RH, and 4 atmospheric pressure for 48 hours is not less than 50%.

18. (Currently amended) A laminate comprising: a metal layer; and a polyimide that is manufactured with

a polyimide film that is prepared by copolymerizing an acid dianhydride component and a diamine component,

the acid dianhydride component including a pyromellitic dianhydride and a biphenyl tetracarboxylic dianhydride, the pyromellitic dianhydride being represented by General Formula (1):

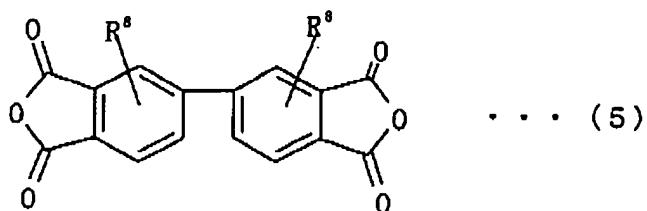


where R¹ is a residue selected from a group consisting of H-, CH₃-, CF₃, Cl-, Br-, F-, and CH₃O-, and R¹ may be the same residues or different residues, and

a biphenyl tetracarboxylic dianhydride being represented by General Formula (5):

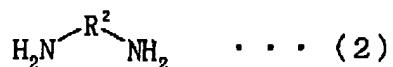
Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



where R⁸ is a residue selected from a group consisting of H-, CH₃-, Cl-, Br-, F- and CH₃O-, and R⁸ may be the same residues or the different residues,

the diamine component including a paraphenylene diamine represented by General Formula (2)



where R² is a bivalent aromatic group selected from a group consisting of:

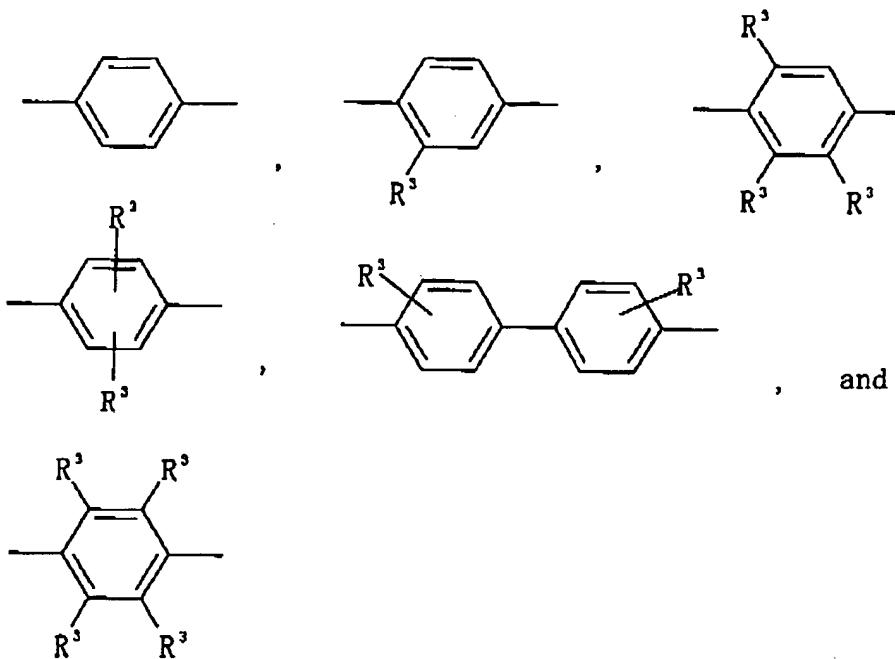
Appl. No. 10/667,134

Amdt. Dated February 12, 2007

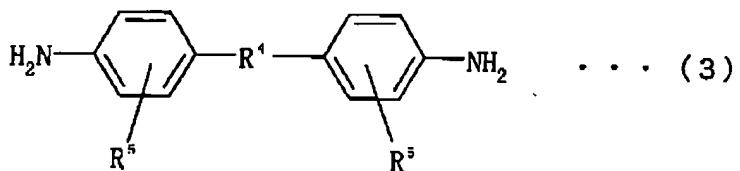
Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005

Customer No.: 26021



and each R³ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃, and a diaminodiphenyl ether represented by General Formula (3),



where R⁴ is a bivalent organic group selected from a group consisting of:

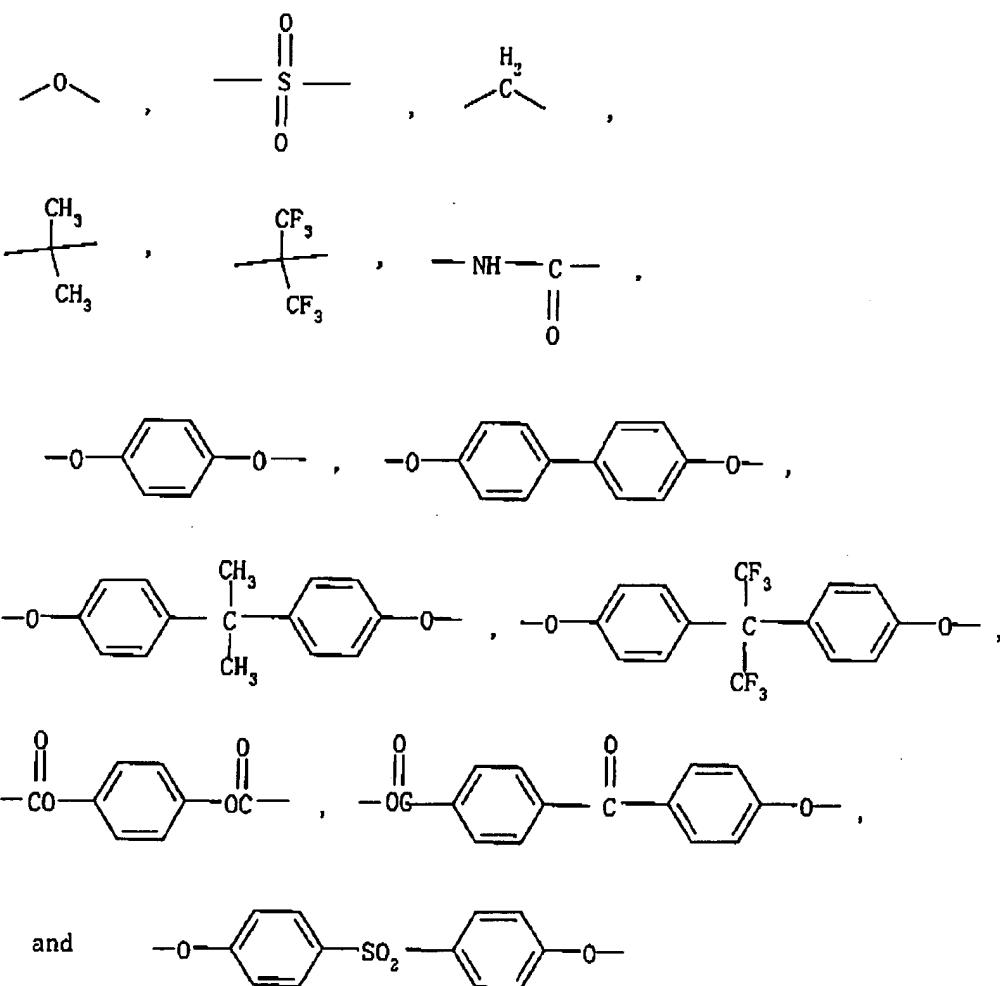
Appl. No. 10/667,134

Amdt. Dated February 12, 2007

Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005

Customer No.: 26021



and each R⁵ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃, wherein:

the acid dianhydride component further including a bis(trimellitic monoester anhydride) represented by General Formula (4),

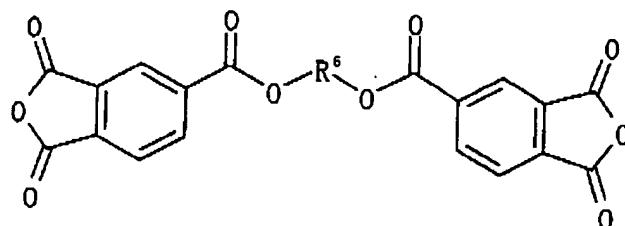
Appl. No. 10/667,134

Attorney Docket No. 89227.0005

Amdt. Dated February 12, 2007

Customer No.: 26021

Reply to Office Action of September 11, 2006



where R⁶ is a bivalent organic group selected from a group consisting of:

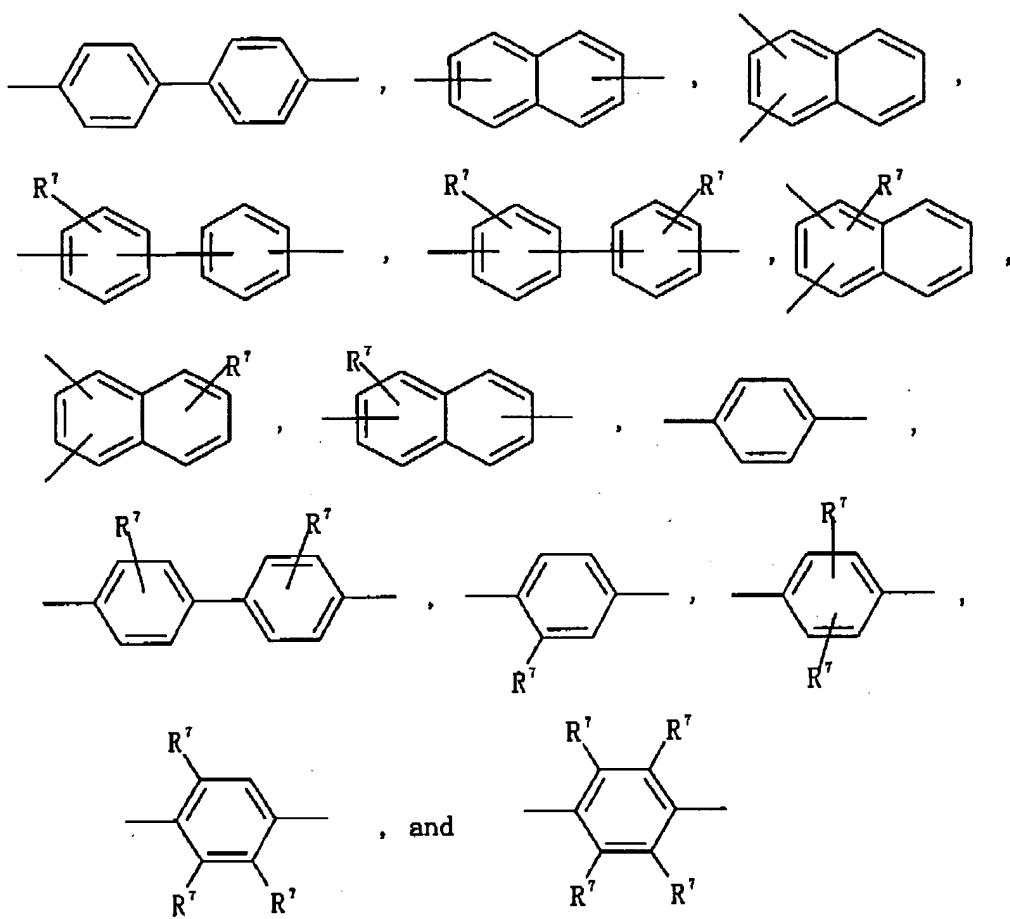
Appl. No. 10/667,134

Amdt. Dated February 12, 2007

Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005

Customer No.: 26021



and each R⁷ is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, and -CO-NH₂,

the polyimide film having such an etching speed that one side thereof is etched with a 1N potassium hydroxide solution at an etching speed of 0.1μm/minute (one side) or higher.

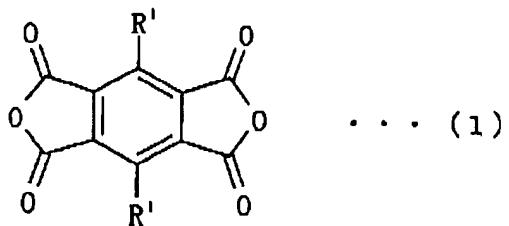
Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

19. (Currently amended) A polyimide film prepared by copolymerizing an acid dianhydride component and a diamine component,

the acid dianhydride component including the pyromellitic dianhydride, represented by General Formula (1), in a range of from [[40]] 50 mole% to [[80]] 70 mole%, the biphenyl tetracarboxylic dianhydride, represented by General Formula (5) in a range of from 1 mole% to 40 mole%, and the bis(trimellitic monoester anhydride, represented by General Formula (4), in a range of from 20 mole% to 50 mole%, and

the diamine component including the paraphenylenediamine, represented by General Formula (2), in a range of 25 mole% to 75 mole%, and the diaminodiphenyl ether, represented by General Formula (3), in a range of 25 mole% to 75 mole%, where General Formula (1) is:

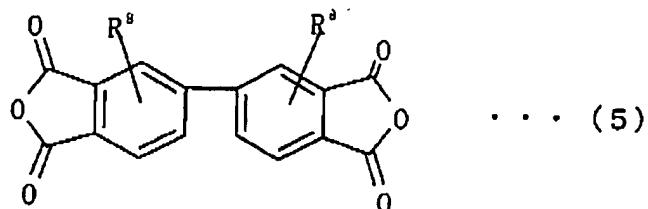


where R¹ is a residue selected from a group consisting of H-, CH₃-, CF₃, Cl-, Br-, F-, and CH₃O-, and R¹ may be the same residues or different residues;

General Formula (5) is:

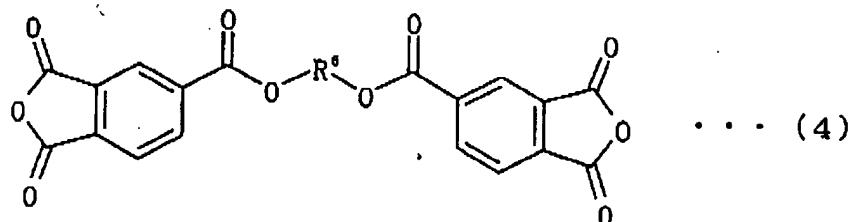
Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



where R^s is a residue selected from a group consisting of H-, CH₃-, Cl-, Br-, F- and CH₃O-, and R^s may be the same residues or the different residues;

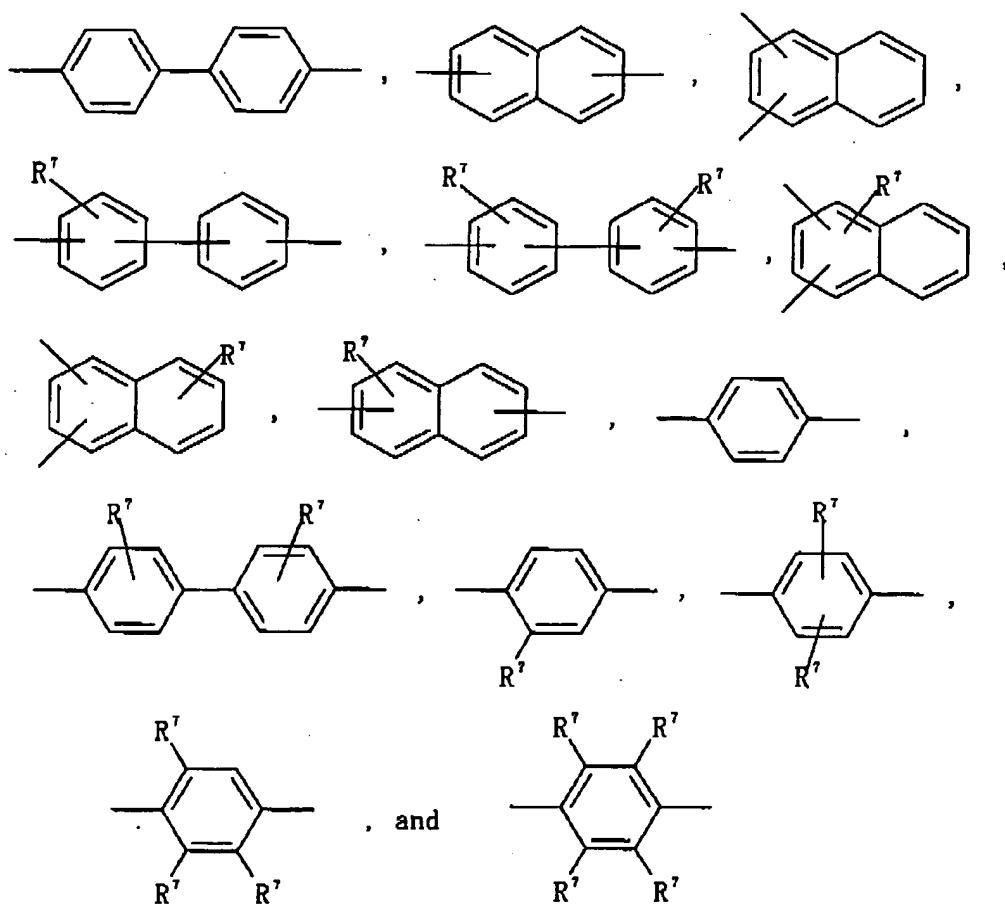
General Formula (4) is:



where R^e is a bivalent organic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



and each R⁷ is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, and -CO-NH₂;

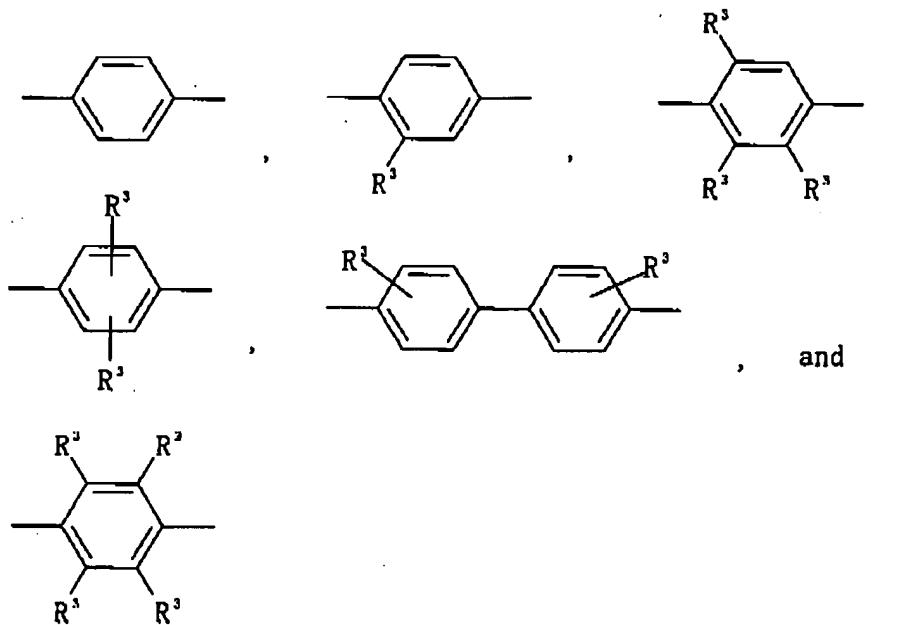
General Formula (2) is:



Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

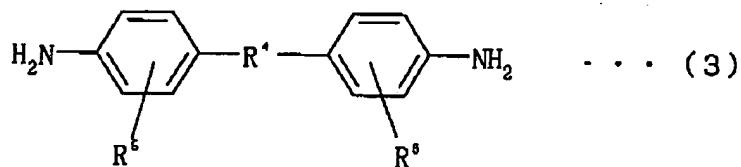
Attorney Docket No. 89227.0005
 Customer No.: 26021

where R² is a bivalent aromatic group selected from a group consisting of:



and each R³ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃; and

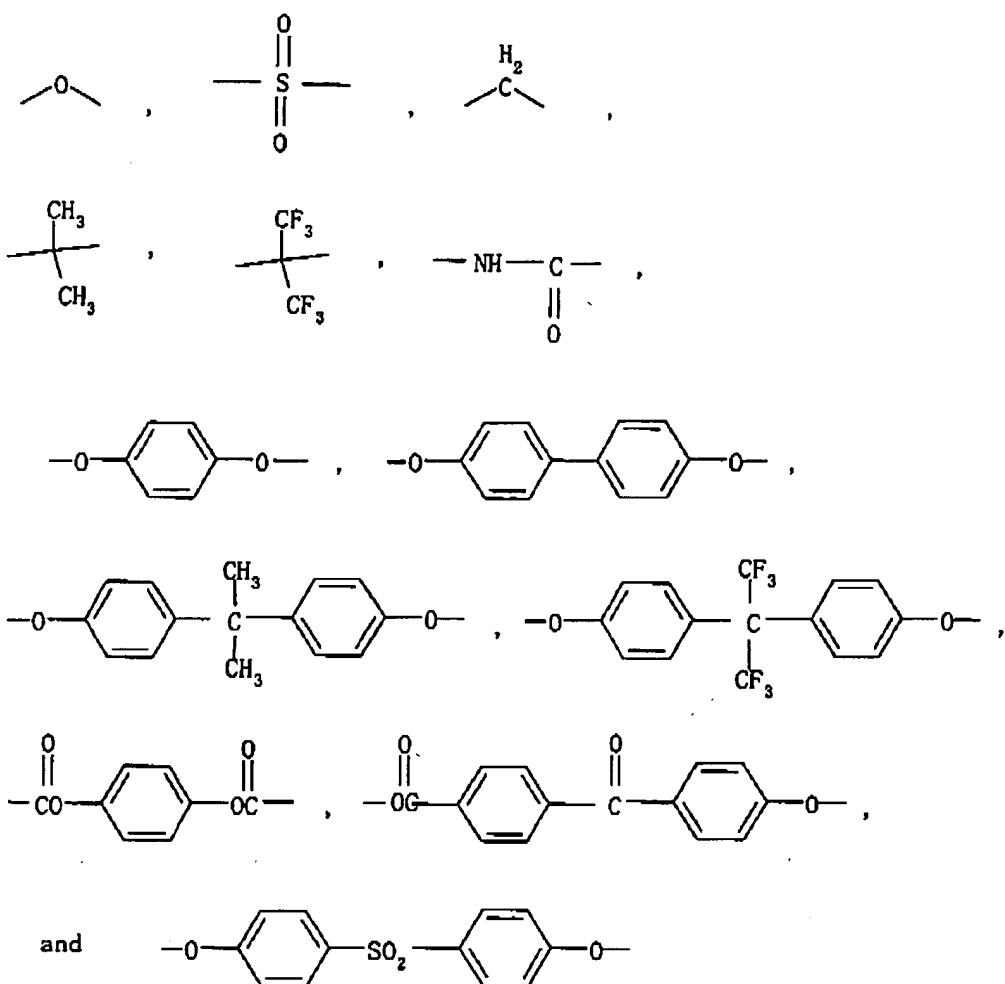
General Formula (3) is:



Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

where R⁴ is a bivalent organic group selected from a group consisting of:



and each R⁵ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃.

Appl. No. 10/667,134
Amtd. Dated February 12, 2007
Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
Customer No.: 26021

20. (Original) The polyimide film as set forth in Claim 19, the polyimide film having a thickness in a range of from 1 μ m to 200 μ m.

21. (Original) The polyimide film as set forth in Claim 19, the polyimide film having a modulus of elasticity in a range of from 500kg/mm² to 800kg/mm².

22. (Original) The polyimide film as set forth in Claim 19, the polyimide film having a coefficient of hygroscopic expansion in a range of from 2ppm/%RH to 20ppm/%RH.

23. (Original) The polyimide film as set forth in Claim 19, the polyimide film having a coefficient of liner expansion in a range of 1 to 30×10^{-6} cm/cm/ $^{\circ}$ C at a temperature of from 100 $^{\circ}$ C to 200 $^{\circ}$ C.

24. (Original) The polyimide film as set forth in Claim 19, wherein:

a peel strength at an interface between the polyimide film and a metal layer of laminate is not less than 5N/cm, the laminate having the polyimide film and the metal layer that is formed on the polyimide film by vacuum depositing and electroplating; and

a retention rate of the peel strength is not less than 10% after exposing the laminate to environment of a temperature of 121 $^{\circ}$ C and a humidity of 100%RH for 12 hours.

25. (Previously presented) Laminate comprising:

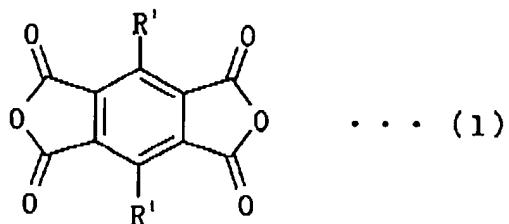
Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

a metal layer; and
 a polyimide film prepared by copolymerizing an acid dianhydride component and a diamine component,

the acid dianhydride component including the pyromellitic dianhydride, represented by General Formula (1), in a range of from 40 mole% to 80 mole%, the biphenyl tetracarboxylic dianhydride, represented by General Formula (5) in a range of from 1 mole% to 40 mole%, and the bis(trimellitic monoester anhydride), represented by General Formula (4), in a range of from 20 mole% to 50 mole%, and

the diamine component including the paraphenylenediamine, represented by General Formula (2), in a range of 25 mole% to 75 mole%, and the diaminodiphenyl ether, represented by General Formula (3), in a range of 25 mole% to 75 mole%, where General Formula (1) is:



where R¹ is a residue selected from a group consisting of H-, CH₃-, CF₃, Cl-, Br-, F-, and CH₃O-, and R¹ may be the same residues or different residues;

General Formula (5) is:

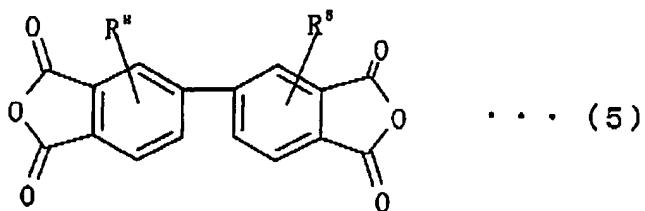
Appl. No. 10/667,134

Attorney Docket No. 89227.0005

Amdt. Dated February 12, 2007

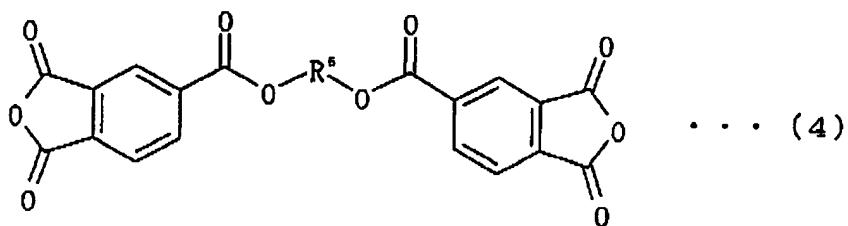
Customer No.: 26021

Reply to Office Action of September 11, 2006



where R^s is a residue selected from a group consisting of H-, CH₃-, Cl-, Br-, F- and CH₃O-, and R^s may be the same residues or the different residues;

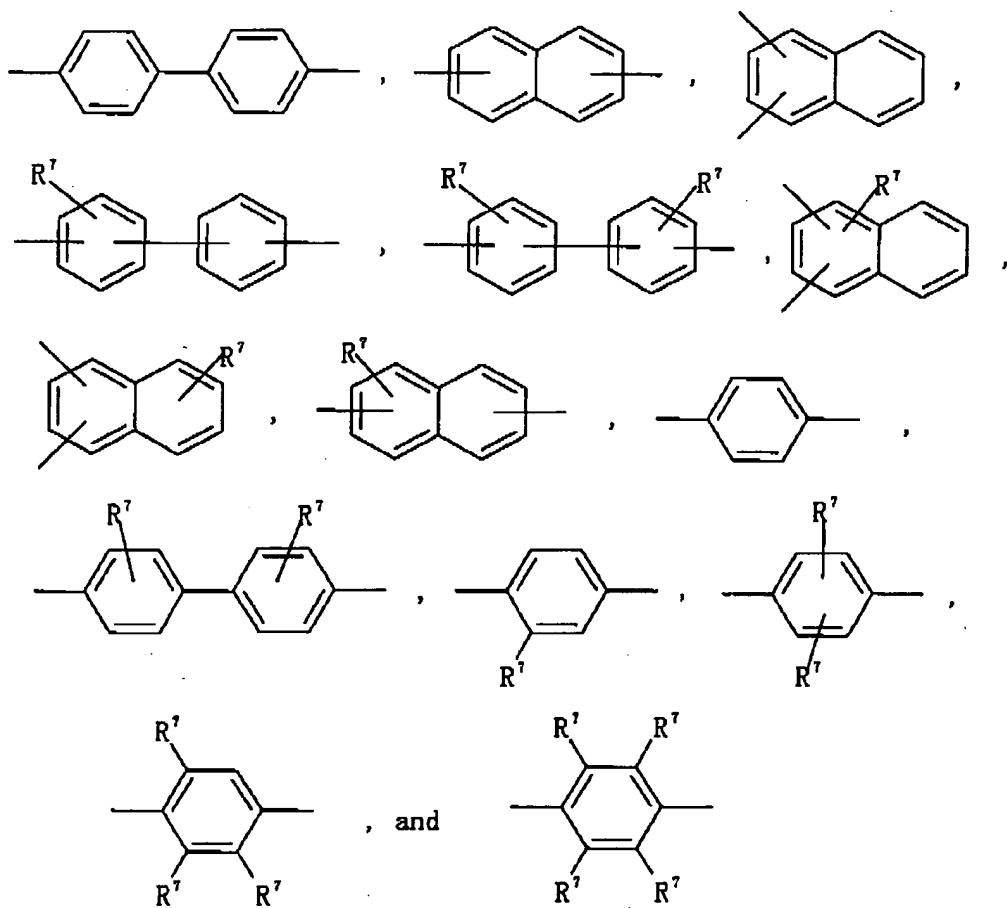
General Formula (4) is:



where R⁶ is a bivalent organic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



and each R⁷ is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, and -CO-NH₂;

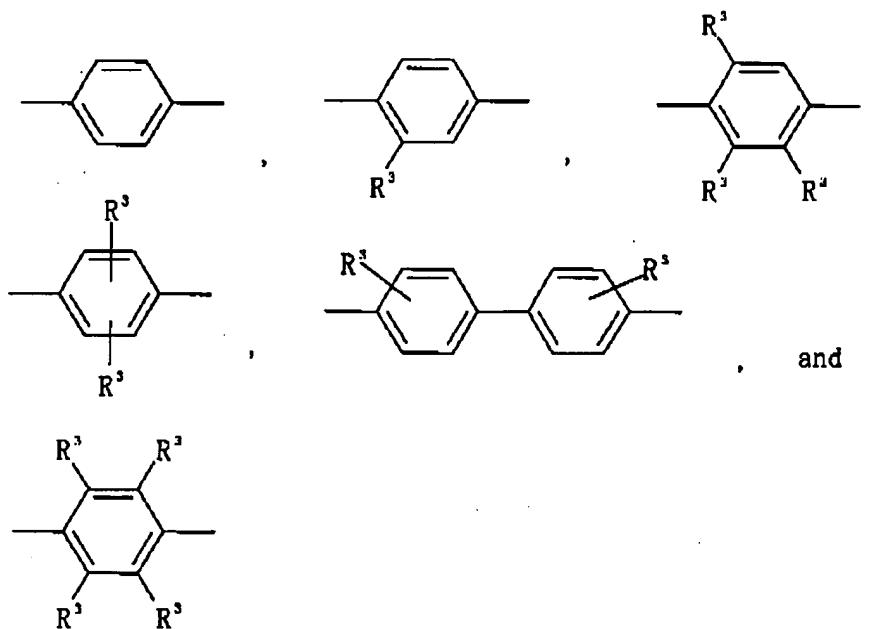
General Formula (2) is:



Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

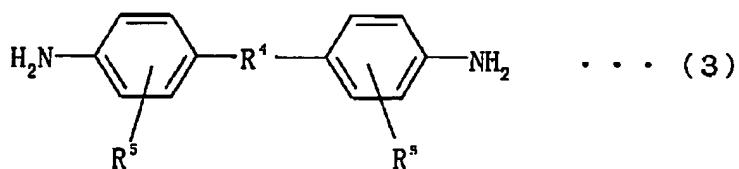
Attorney Docket No. 89227.0005
 Customer No.: 26021

where R² is a bivalent aromatic group selected from a group consisting of:



and each R³ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃; and

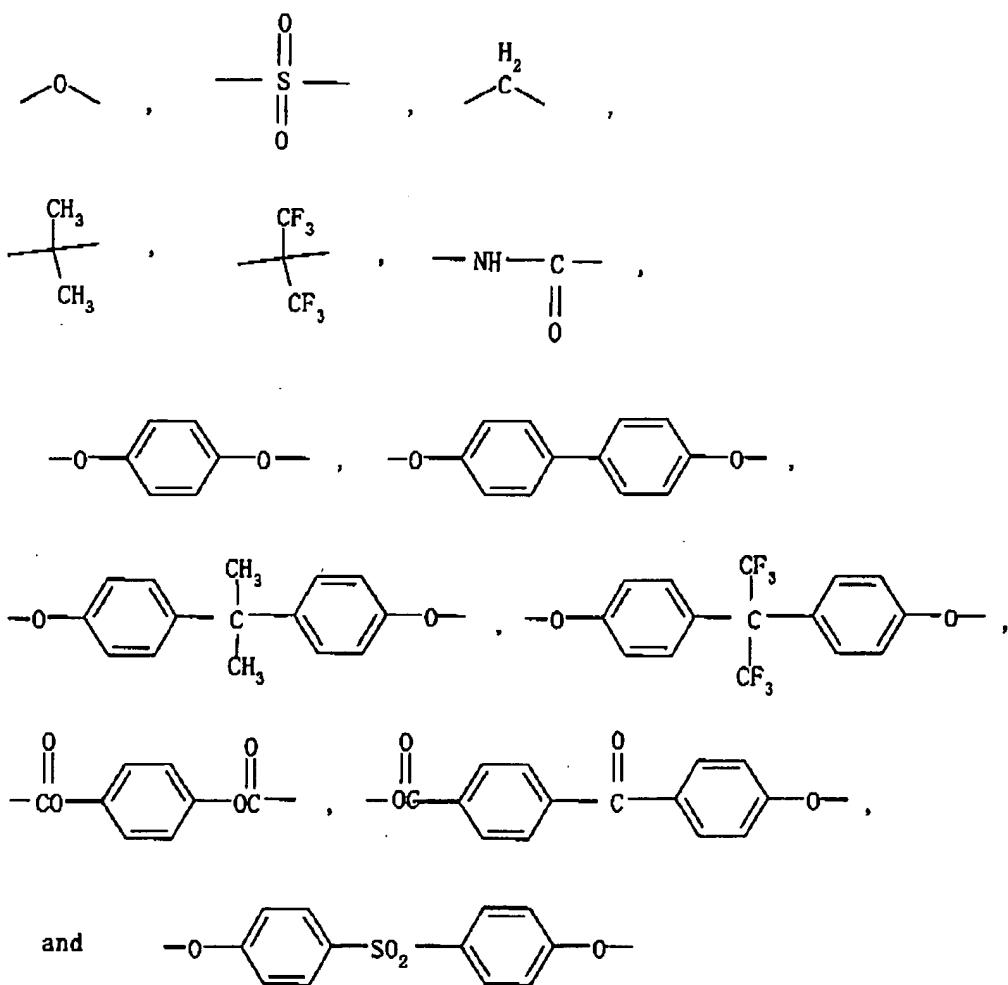
General Formula (3) is:



Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

where R⁴ is a bivalent organic group selected from a group consisting of:

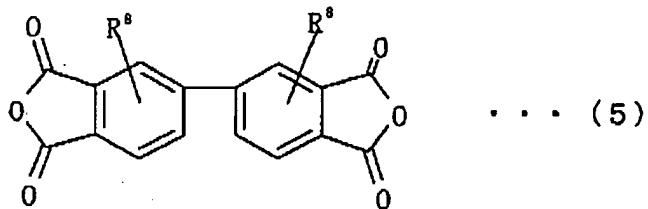


and each R⁵ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃.

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

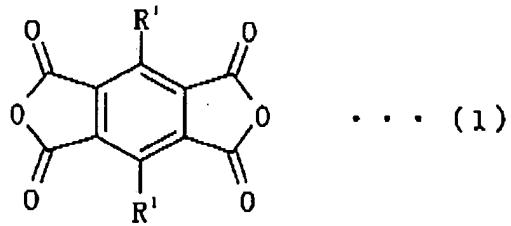
26. (Previously presented) The laminate as set forth in claim 5, wherein the acid dianhydride component includes a biphenyl tetracarboxylic dianhydride represented by General Formula (5)



where R^8 is a residue selected from a group consisting of H-, CH₃-, Cl-, Br-, F- and CH₃O-, and R^8 may be the same residues or the different residues.

27. (Previously presented) A polyimide film prepared by copolymerizing an acid dianhydride component and a diamine component,

the acid dianhydride component including a pyromellitic dianhydride represented by General Formula (1),



where R^1 is a residue selected from a group consisting of H-, CH₃-, CF₃, Cl-, Br-, F-, and CH₃O-, and R^1 may be the same residues or different residues, and

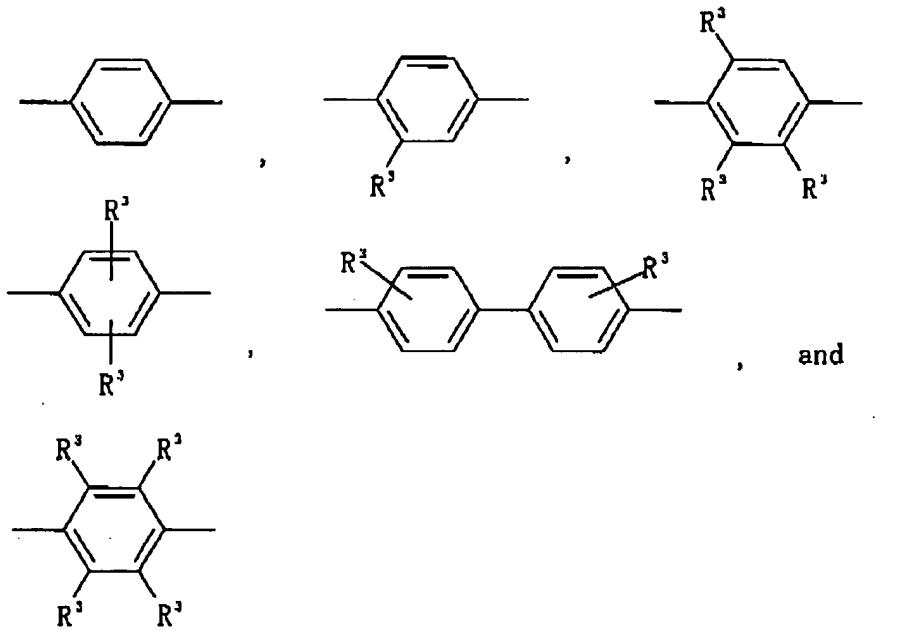
the diamine component including a paraphenylene diamine represented by General Formula (2)

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



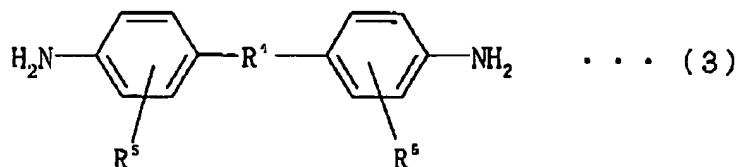
where R^2 is a bivalent aromatic group selected from a group consisting of:



and each R^3 in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃, and a diaminodiphenyl ether represented by General Formula (3),

Appl. No. 10/667,134
Amdt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
Customer No.: 26021



where R⁴ is a bivalent organic group selected from a group consisting of:

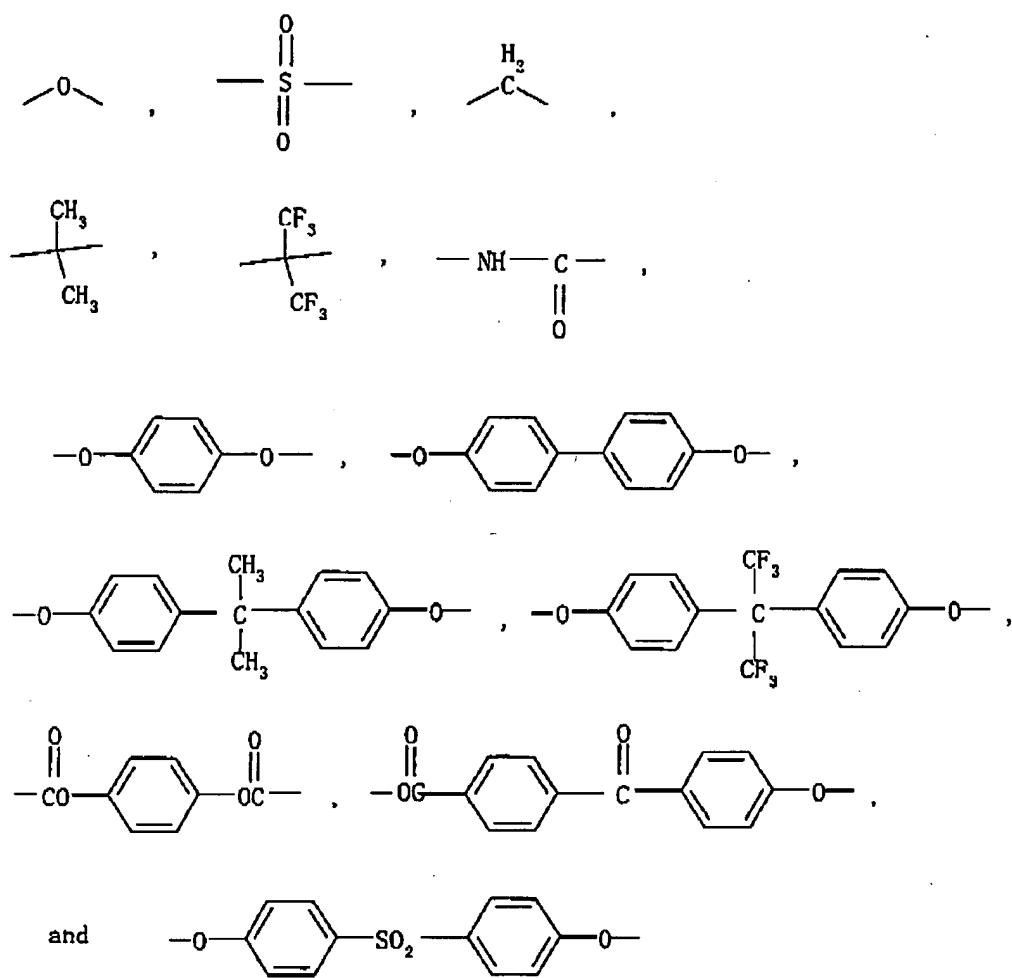
Appl. No. 10/667,134

Amdt. Dated February 12, 2007

Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005

Customer No.: 26021

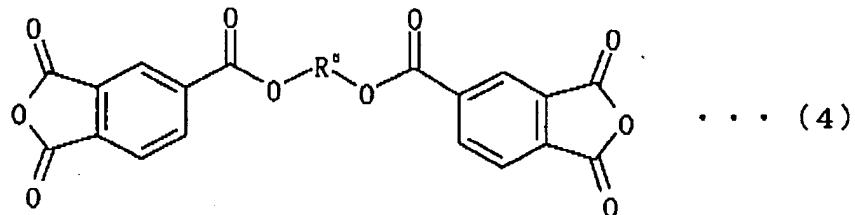


and each R^5 in the group is independently any one of -H, - CH_3 , -OH, - CF_3 , - SO_4 , -COOH, -CO-NH₂, -Cl, -Br, -F, and - OCH_3 ,
wherein:

the acid dianhydride component further including a bis(trimellitic monoester anhydride) represented by General Formula (4),

Appl. No. 10/667,134
Am dt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

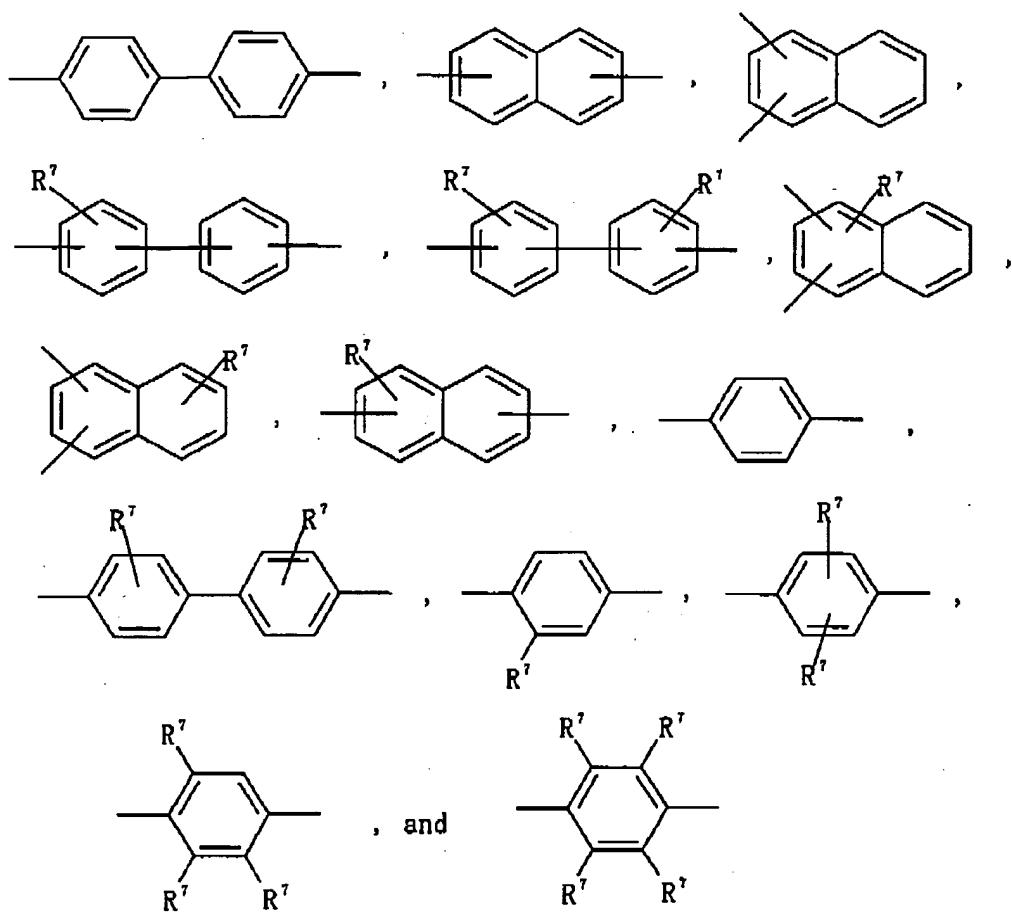
Attorney Docket No. 89227.0005
Customer No.: 26021



where R⁶ is a bivalent organic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



and each R⁷ is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, and -CO-NH₂,

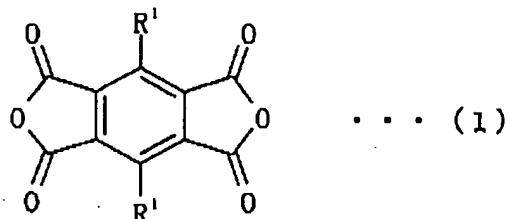
the polyimide film having a dynamic viscoelasticity whose tan δ peak is located in a range of not less than 310°C but not more than 410°C, and whose tan δ value at 300°C is not more than 0.05.

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

28. (Previously presented) A polyimide film prepared by copolymerizing an acid dianhydride component and a diamine component,

the acid dianhydride component including a pyromellitic dianhydride represented by General Formula (1),



where R¹ is a residue selected from a group consisting of H-, CH₃-, CF₃, Cl-, Br-, F-, and CH₃O-, and R¹ may be the same residues or different residues, and

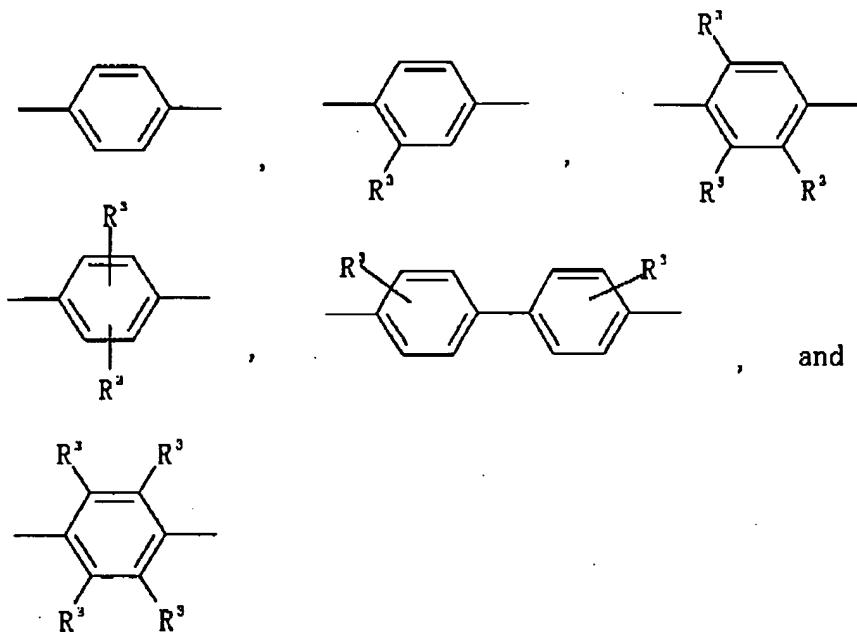
the diamine component including a paraphenylene diamine represented by General Formula (2)



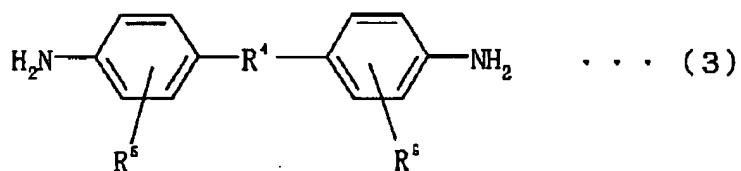
where R² is a bivalent aromatic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



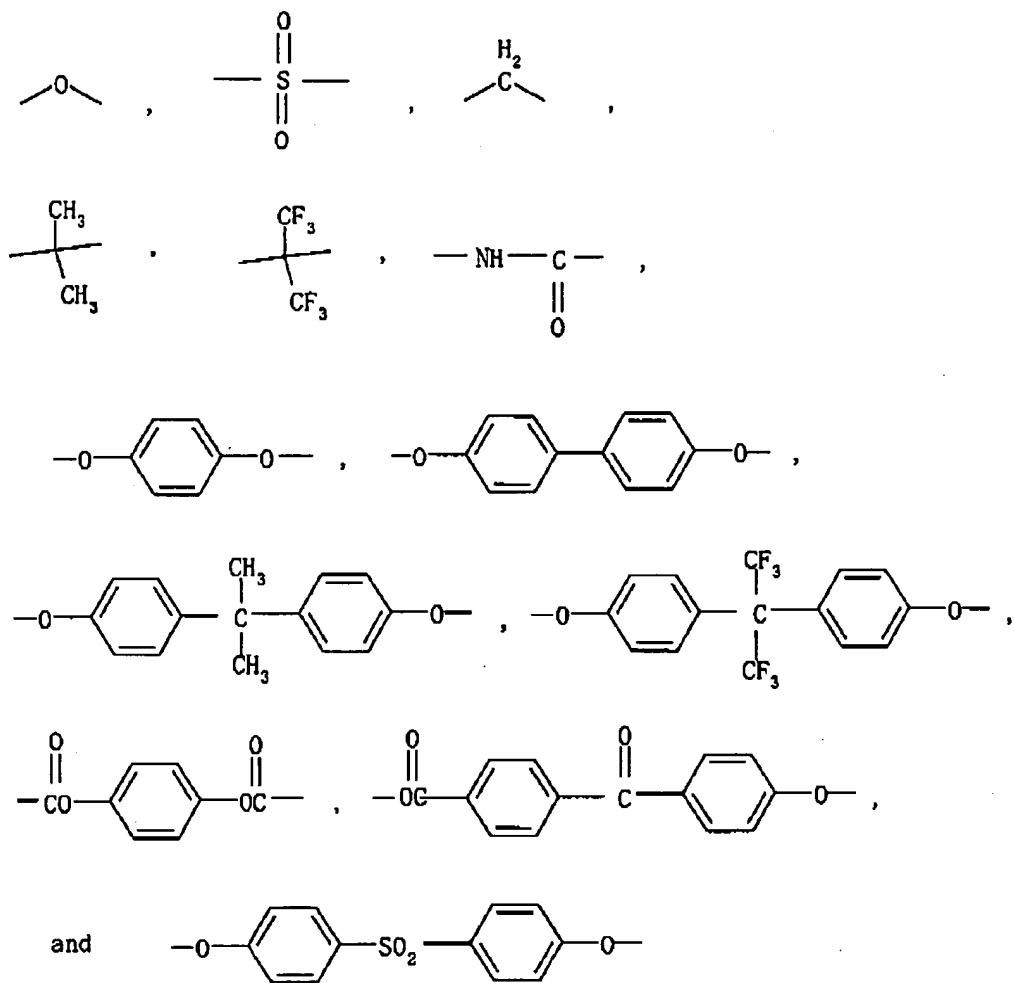
and each R³ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃, and
 a diaminodiphenyl ether represented by General Formula (3),



where R⁴ is a bivalent organic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

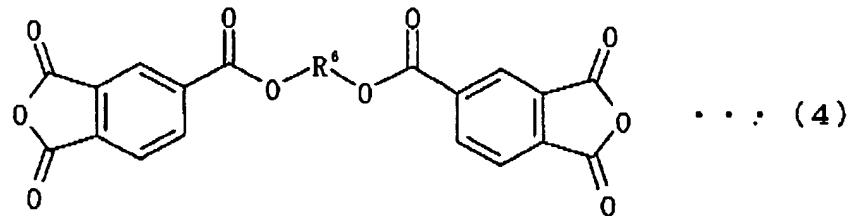


and each R⁵ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃,
 wherein:

the acid dianhydride component further including a bis(trimellitic monoester anhydride) represented by General Formula (4).

Appl. No. 10/667,134
Amdt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

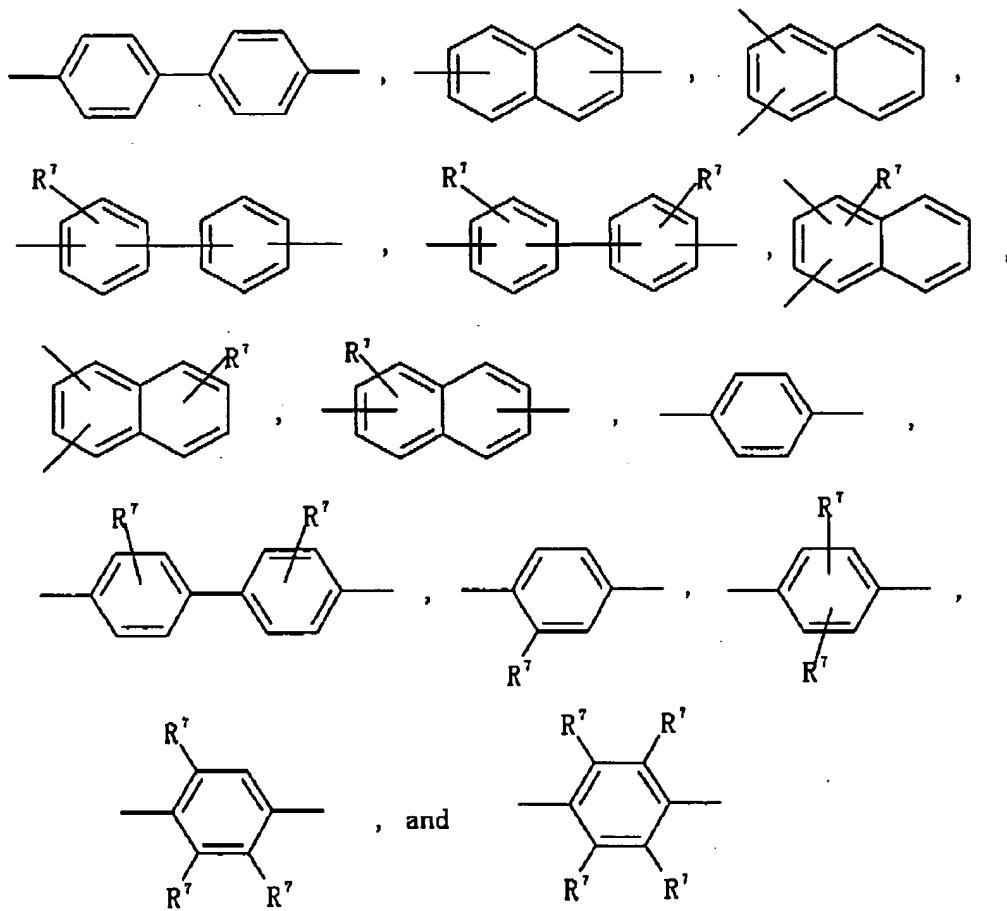
Attorney Docket No. 89227.0005
Customer No.: 26021



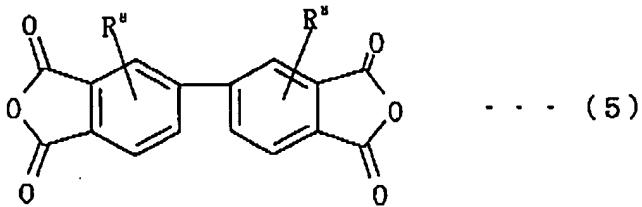
where R⁶ is a bivalent organic group selected from a group consisting of:

Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021



and each R⁷ is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, and -CO-NH₂, and
 a biphenyl tetracarboxylic dianhydride represented by General Formula (5),



Appl. No. 10/667,134
Amdt. Dated February 12, 2007
Reply to Office Action of September 11, 2006

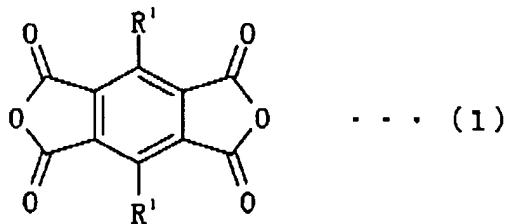
**Attorney Docket No. 89227.0005
Customer No.: 26021**

where R⁸ is a residue selected from a group consisting of H-, CH₃-, Cl-, Br-, F- and CH₃O-, and R⁸ may be the same residues or the different residues,

the polyimide film having a dynamic viscoelasticity whose $\tan \delta$ peak is located in a range of not less than 310°C but not more than 410°C , and whose $\tan \delta$ value at 300°C is not more than 0.05.

29-30. (Canceled)

31. (Previously presented) A polyimide film in which a pyromellitic dianhydride represented by General Formula (1),



where R¹ is a residue selected from a group consisting of H-, CH₃-, CF₃, Cl-, Br-, F-, and CH₃O-, and R¹ may be the same residues or different residues,

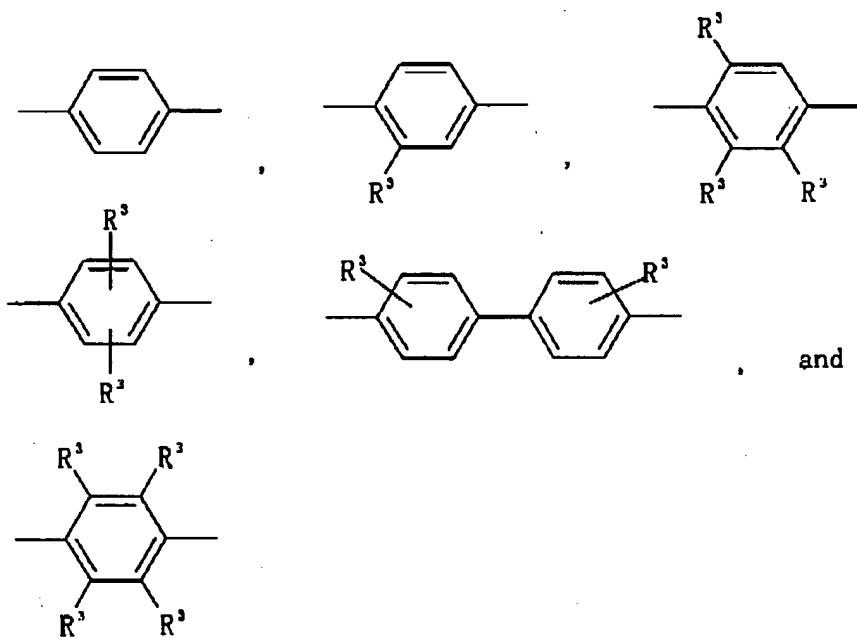
a paraphenylene diamine represented by General Formula (2)



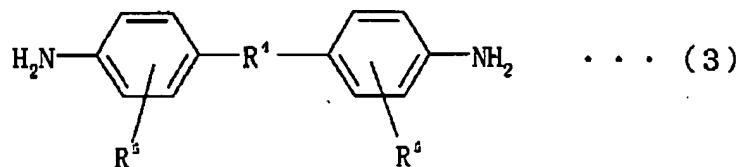
Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

where R² is a bivalent aromatic group selected from a group consisting of:



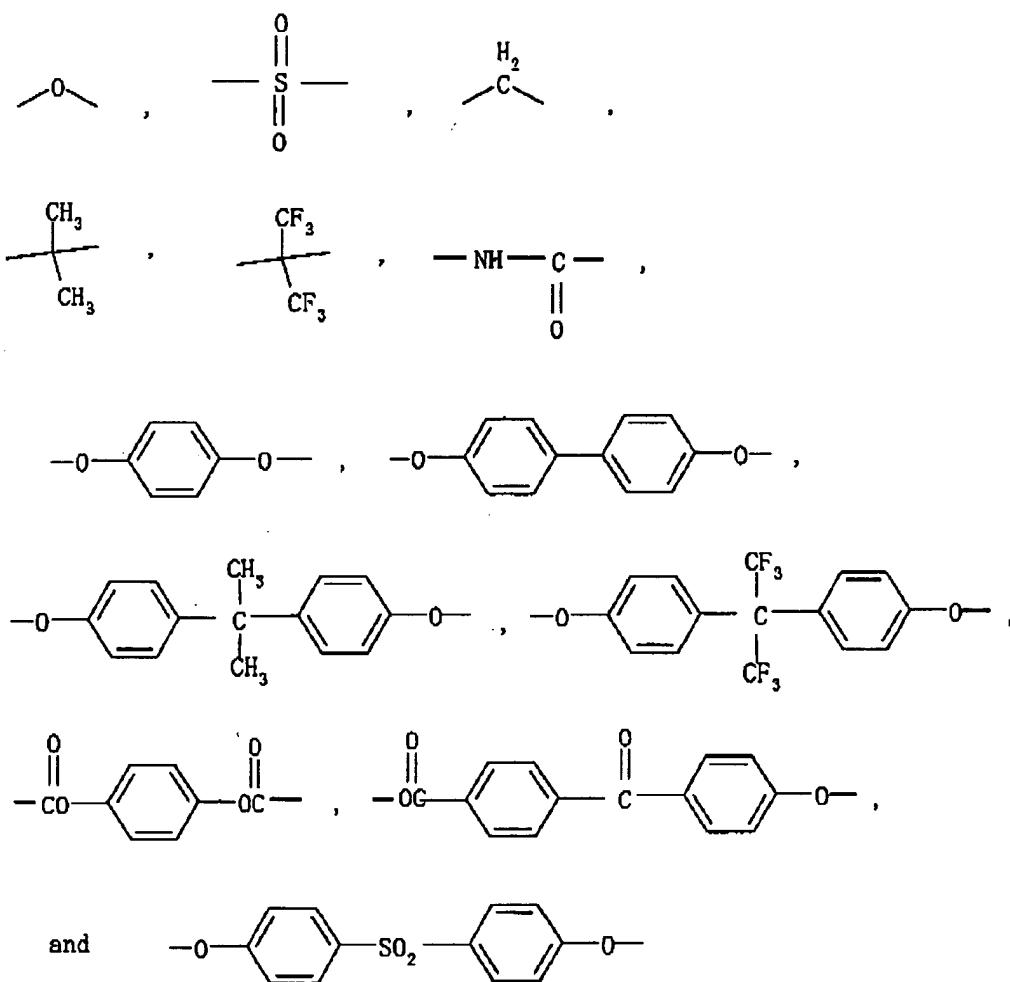
and each R³ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃, and a diaminodiphenyl ether represented by General Formula (3),



Appl. No. 10/667,134
 Amdt. Dated February 12, 2007
 Reply to Office Action of September 11, 2006

Attorney Docket No. 89227.0005
 Customer No.: 26021

where R⁴ is a bivalent organic group selected from a group consisting of:



and each R⁵ in the group is independently any one of -H, -CH₃, -OH, -CF₃, -SO₄, -COOH, -CO-NH₂, -Cl, -Br, -F, and -OCH₃,

are co-polymerized as necessary components,

Appl. No. 10/667,134

Attorney Docket No. 89227.0005

Amdt. Dated February 12, 2007

Customer No.: 26021

Reply to Office Action of September 11, 2006

the polyimide film being manufactured by a method in which 5 mole% to 50 mole% of p-phenylene bis(trimellitic monoester anhydride) is used as an acid dianhydride component, and in which a peak of tan δ in measuring dynamic viscoelasticity of the polyimide film is controlled in a range of 310°C to 410°C.